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09/887,848	06/22/2001	Robert C. Newman JR.	P99-16	8629

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Patent Department  
Lutron Electronics Company, Inc.  
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EXAMINER

LEE, WILSON

ART UNIT

PAPER NUMBER

2821

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/887,848

Applicant(s)

NEWMAN ET AL.

Examiner

Wilson Lee

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14, 15, 35 and 36 is/are allowed.
- 6) ☒ Claim(s) 1-9, 16-29 and 32-34 is/are rejected.
- 7) ☒ Claim(s) 10-13, 30 and 31 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **Claim Rejections – 35 U.S.C. 112**

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-4, 6-8, 17-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 2, “a cat ear power supply” is vague because the disclosure does not explain how this name relates to the power supply. Examiner finds no other references including this particular name.

Claims 3 and 4 are indefinite by virtue of their dependency on claim 2.

Regarding Claim 6, “a cat ear power supply” is vague because the disclosure does not explain how this name relates to the power supply. Examiner finds no other references including this particular name.

Claims 7 and 8 are indefinite by virtue of their dependency on claim 6.

Regarding Claim 17, “a cat ear power supply” is vague because the disclosure does not explain how this name relates to the power supply. Examiner finds no other references including this particular name.

Claims 18-24 are indefinite by virtue of their dependency on claim 17.

### **Claim Rejections – 35 U.S.C. 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –



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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-9, 17, 32, 33, 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Cho et al. (6,316,883).

Regarding Claim 1, Cho discloses an electronic ballast (See Figures 4 and 5) for driving a gas discharge lamp (lamp), the ballast drawing an essentially sinusoidal AC input current from an AC power supply ( $V_{src}$ ), the ballast comprising:

- a rectifier (1) for rectifying said AC input voltage from said AC power supply to produce a rectified bus voltage;
- an inverter (2) for converting said rectified bus voltage to a high frequency AC drive voltage to drive the lamp; and
- a valley-fill circuit (4) as a current drawing means coupled to receive the rectified bus voltage for selectively drawing current from the AC power supply ( $V_{src}$ ) so that the input current to said ballast is essentially sinusoidal (See Abstract and Col. 13, lines 37-40).

Regarding Claim 2, Cho discloses that current drawing means includes a power supply.

Regarding Claim 3, Cho discloses that the power supply (4) includes means for drawing current from said AC power supply when said AC input voltage waveform is less than a predetermined value (e.g. nearly zero in level) (See Col. 13, lines 47-53).

Regarding Claim 4, Cho discloses that the power supply (4) includes means for drawing current from said AC power supply when the current drawn by said inverter from is substantially zero (See Col. 13, lines 37-53).

Regarding Claim 5, Cho discloses that an electronic ballast for driving a gas discharge lamp, the ballast having improved input current total harmonic distortion (See Col. 1, lines 27-46 and Col. 8, lines 27-47), the ballast comprising:

- a rectifier (1) for rectifying an AC input voltage from an AC power supply to produce a rectified bus voltage;
- an inverter (2) for converting the rectified bus voltage to a high-frequency AC output voltage to drive said lamp; and
- means (4) for drawing current from the AC power supply near the zero crossing of the AC input voltage so that the input current THD is substantially reduced (See Col. 1, lines 27-46, Col. 8, lines 27-47 and Col. 13, lines 37-53).

Regarding Claim 6, Cho discloses that a control circuit (3) connected to drive said inverter; and wherein the means for drawing comprises a power supply for supplying power to operate the control circuit.

Regarding Claim 7, Cho discloses that a power supply (4) includes means for drawing current from said AC power supply when said AC input voltage waveform is less than a predetermined value (e.g. nearly zero in level) (See Col. 13, lines 47-53).

Regarding Claim 8, Cho discloses that a power supply includes means for drawing current from said AC power supply when the current drawn by said inverter from the AC power supply is substantially zero (See Col. 13, lines 37-53).

Regarding Claim 9, Cho discloses that an electronic ballast for driving a gas discharge lamp, the ballast having improved power factor and total harmonic distortion (THD) (See Col. 1, lines 27-46 and Col. 8, lines 27-47), the ballast comprising:

- a rectifier (1) for rectifying an AC input voltage from an AC power supply to produce a rectified bus voltage;
- a valley-fill circuit (4) having an energy storage device (Cdc1, Cdc2), said valley-fill circuit electrically coupled to receive the rectified bus voltage;
- an inverter (2) for converting the rectified bus voltage to a high frequency AC output voltage to drive said lamp; and
- energy delivery control means (e.g. D20, D30) for controlling the delivery of energy to the energy storage device over a substantial portion of each half-cycle of the AC input voltage (See Col. 9, lines 22-32) so that the ballast power factor and THD are substantially improved (See Col. 1, lines 27-46 and Col. 8, lines 27-47).

Regarding Claim 17, Cho discloses that an electronic ballast for driving a gas discharge lamp, the ballast including a rectifier (1) for receiving a supply of sinusoidal alternating current power and producing a rectified direct current bus voltage, a valley-fill circuit (4) for receiving the rectified direct current bus voltage and maintaining the bus voltage above a predetermined minimum voltage, an inverter (2) for receiving

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the bus voltage and producing a high-frequency alternating current voltage for driving the gas discharge lamp, and a control circuit (3) for producing control signals to control the operation of the inverter, the ballast comprising:

a power supply (Cdc1, Cdc2) for supplying power to the control circuit, said power supply adapted to draw power from the supply of sinusoidal alternating current power only during a predetermined portion of each half-cycle of the sinusoidal alternating current power (See Col. 9, lines 22-32).

Regarding Claim 32, Cho discloses that an electronic ballast (See Figures 4 and 5) for driving a gas discharge lamp, including:

- a rectifier (1) for receiving a supply of sinusoidal alternating current power and producing a rectified direct current bus voltage;
- a valley-fill circuit (4) for receiving the rectified direct current bus voltage and maintaining the bus voltage above a predetermined minimum voltage (e.g. nearly zero in level) (See Col. 13, lines 47-53).;
- an inverter (2) for receiving the bus voltage and producing a high frequency alternating current voltage for driving the gas discharge lamp; and
- a control circuit (3) for producing control signals to control the operation of the inverter;
- the improvement comprising:
- a power supply (Cdc1, Cdc2) operatively connected to draw power from said supply of sinusoidal alternating current power, said power supply further

operatively connected to supply power to said control circuit, said power supply being the sole source of power for said control circuit.

Regarding Claim 33, Cho discloses that the power supply comprises means for drawing power from said supply of sinusoidal alternating current power during a predetermined portion of each half-cycle of said sinusoidal alternating current power (See Col. 9, lines 22-36).

Regarding Claim 34, Cho discloses that a method for causing an electronic ballast, of the type including a control circuit, to draw more nearly sinusoidal input current from a source of sinusoidal alternating current power, said method comprising the steps of (See Col. 9, lines 7-36):

- providing a power supply in said ballast for drawing current from said source of sinusoidal alternating current power during a predetermined portion of each half-cycle of said sinusoidal alternating current power;
- causing said power supply to draw said current from said source of sinusoidal alternating current power during said predetermined portion of each half cycle of said sinusoidal alternating current power; and
- causing said power supply to supply power to said control circuit throughout each said half-cycle.

Claims 16, 25-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Crouse et al. (5,925,990).

Regarding Claim 16, Crouse discloses an electronic ballast for driving a gas discharge lamp, the ballast including a valley-fill circuit including a bus capacitor, the



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ballast having integral over-voltage protection for the bus capacitor (85) (See Col. 5, lines 37-51), the ballast comprising:

a rectifier (51); an inverter (54); and said valley-fill circuit (52) connected between said rectifier and said inverter, said valley-fill circuit including a buck converter (52)

connected between an output of said rectifier (51) and an input of said inverter (54).

Regarding Claim 25, Crouse discloses that an electronic ballast for driving a gas discharge lamp, the ballast comprising:

- a rectifier (51) for receiving a supply of sinusoidal alternating current power and producing a rectified direct current bus voltage;
- a valley-fill circuit (52) for receiving the rectified direct current bus voltage and maintaining the bus voltage (on capacitor 53) above a predetermined minimum voltage;
- an inverter (54) for receiving the bus voltage and producing a high frequency alternating current voltage for driving the gas discharge lamp; and
- a control circuit (67) for producing control signals to control the operation of the inverter;
- said valley-fill circuit (52) including an energy storage element (53 or inductance that connects to capacitor 53), an impedance, and a switch (e.g. a mosfet that connects to circuit 61);
- said energy storage element adapted to be connected between said bus voltage (e.g. the upper terminal of capacitor 13) and a circuit common (e.g. ground) by

means of said impedance when said switch is in a first predetermined conductive state so as to store energy.

Regarding Claim 26, Crouse discloses that said energy storage element comprises a capacitor (53) (See Figure 2).

Regarding Claim 27, Crouse discloses that said impedance comprises an inductor (inductance that connects to capacitor 53) (See Figure 2).

Regarding Claim 28, Crouse discloses that said impedance comprises a resistor (e.g. any resistors of the boost section 52) (See Figure 2).

Regarding Claim 29, Crouse discloses that said switch comprises a field-effect transistor (e.g. mosfet) (See Figure 2).

#### **Allowable subject matter**

Claims 10-13, 30, 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 18-24 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 14, 15, 35, 36 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art neither discloses nor suggest that:

- the ballast having improved input current THD comprising:

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- a rectifier for rectifying an AC input voltage from an AC power supply to produce a rectified bus voltage;
  - a valley-fill circuit having an energy storage device connected to filter said rectified bus voltage;
  - an inverter including series connected first and second switching elements having duty cycles  $D$  and  $1-D$ , respectively, where  $0 \leq D \leq 1$ ; and
  - means for varying said duty cycle  $D$  responsive to said bus voltage to cause said energy storage device to draw more current from said AC power supply around the peak of each half-cycle of said bus voltage and to cause said energy storage device to draw less current from said AC power supply around the trough of each half-cycle of said bus voltage such as required by claim 14.
- a method for decreasing ballast input current total harmonic distortion and reducing lamp current crest factor comprising the steps of:
- switching the second and third series-connected controllably conductive devices so that they have complementary duty cycles; within each half-cycle of the voltage supplied by the AC power supply,
  - varying the duty cycles of the second and third series-connected controllably conductive devices so that the duty cycles are substantially unequal during the middle portion of each said half-cycle, and substantially equal during the beginning and ending portions of each said half-cycle; within each said half-cycle,

- varying the conduction of the first controllably device in a predetermined manner so that the energy storing device draws more current from the AC supply during the middle portion of each said halfcycle, and less current from the AC supply during the beginning and ending portions of each said half-cycle such as required by claim 35.
- a method for decreasing ballast input current total harmonic distortion comprising the steps of:
  - within each half-cycle of the AC power supply voltage,
  - varying the conduction of the first controllably device in a predetermined manner so that the energy storing device draws more current from the AC supply during the middle portion of each said half-cycle, and less current from the AC supply during the beginning and ending portions of each said half-cycle such as required by claim 36.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shackle et al. (5,539,281) discloses an externally dimmable electronic ballast comprising boost circuit, inverter, and rectifier.

**Correspondence**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Wilson Lee whose telephone number is (703) 306-3426.

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center receptionist whose telephone number is (703) 308-0956.

Papers related to Technology Center 2800 applications may be submitted to Technology Center 2800 by facsimile transmission. Any transmission not to be considered an official response must be clearly marked "DRAFT". The Technology Center Fax number is (703) 308-7722 or (703) 308-7724.

A handwritten signature in black ink, appearing to read "Wilson Lee", is positioned above the title "Patent Examiner". The signature is fluid and cursive.

Patent Examiner

WL

12/2/02